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Gene Section
Mini Review

STK4 (serine/threonine kinase 4)

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Identity

Hugo: STK4
Other names: MST1; KRS2
Location: 20q11.2-q13.2
Local order: centromere - YWHAB - TOMM34 - STK4 - MATN4 - RBPSUHL - telomere.
Note: STK4 encodes a serine/threonine specific protein kinase that is a member of the GC kinase branch of the STE20 family. STK4 plays a role in apoptosis and may have tumor suppressor function.

DNA/RNA

Description

The STK4 gene contains 11 exons. The sizes of the exons 1-11 are 68, 81, 129, 115, 165, 168, 138, 129, 192, 154, and 585 bps. Exon 1 contains the 5' untranslated region and the translation initation ATG, and a few additional codons. Exon 11 contains the stop codon and the 3' untranslated region. Other features of the STK4 gene, such as promoters or enhancer elements, have not been described.

Transcription

A 7 kb transcript is detected in many tissues with highest steady state levels in the thymus amd bone marrow. The predominant human STK4 mRNA encodes an open reading frame of 1883 bases, resulting in a predicted proteins of 487 amino acids.

Protein

Description

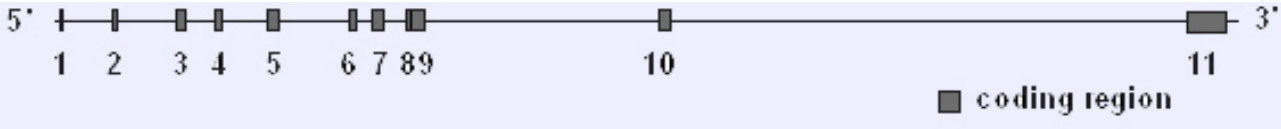
STK4 is a member of the GC kinase group of the STE20 family of serine/threonine protein kinases. STK4 homodimerizes through a C-terminal motif, and removal of the C terminus results in marked activation of the kinase. STK4 is cleaved by caspases during apotosis, releasing an active 34 kD kinase fragment. STK4 associates with the WW-domain protein Salvadore, which may link STK4 to the LATS tumor suppressor pathway.

Expression

Widely expressed in both embryonic and adult tissues.

Localisation

Nucleus and cytoplasm. In the nucleus, STK4 phosphorylates Histone 2B at Ser 14, a modification associated with chromosome condensation in apoptotic cells.



The alignment of STK4 mRNA to its genomic sequence.

Structure of STK4 protein. The catalytic (protein kinase) domain occupies the N-terminal half of STK4. The regulatory domain inhibits kinase activity and also contains a dimerization motif. A caspase-sensitive cleavage site is located between these two domains.

Function

STK4 plays a role in promoting apotosis, in particular, in chromosome condensation during programmed cell death. STK4 is cleaved by caspase 3 during apoptosis, releasing the highly active N-terminal kinase domain. This active protein promotes apoptosis by activating JNK and also by further caspase activation. STK4, and/or the highly related protein STK3, may act as tumor suppressors, acting downstream of Raf.

Homology

STK3 (a.k.a. MST2, KRS1).

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